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Monocotyledons,' the argument being in substance that which she contributed to a discussion of the subject at the Southport meeting of the British Association. It is claimed that the monocotyledons are descended from an ancestry with two cotyledons and that the single cotyledon which distinguishes them is a member formed by a fusion of the pair. Isabel S. Smith has studied 'The Nutrition of the Egg in *Zamia*,' showing that the so-called nuclei reported to pass through the jacket-cells into the egg are the ends of haustoria sent out by the cytoplasm of the egg into the jacket-cells. Mary E. Opperman has published 'A Contribution to the Life History of *Aster*,' in which she treats of the development of the embryo sac and fertilization. Among the interesting points is a discovery of an antipodal cell fusing as an egg and about to be fertilized. J. Cardot and I. Theriot publish their second paper on 'The New or Unrecorded Mosses of North America,' describing numerous new forms. B. E. Livingston writes on the 'Physical Properties of Bog Water,' and from tests he has made draws the conclusion that bog waters do not have an appreciably higher concentration of dissolved substances than do the streams and lakes of the same region. J. N. Rose publishes a biographical sketch with portrait of the late William M. Canby. Francis Ramaley publishes a short preliminary statement of 'The Anatomy of the Cotyledons' in Cruciferae and Ranunculaceae.

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#### SOCIETIES AND ACADEMIES.

##### THE GEOLOGICAL SOCIETY OF WASHINGTON.

At the 157th meeting, held on May 11, Mr. G. O. Smith presented a paper on 'Stratigraphic Problems in the Northern Cascades.'

In western Washington, the Eocene was characteristically an epoch of sedimentations, just as the Miocene was one of vulcanism. The Eocene sediments are economically important by reason of the coals of the Puget formation on the west slope of the Cascades, and of the Roslyn formation on the eastern slope.

Study of the Eocene formations has shown that the sediments were contributed from land areas possessing topographic diversity, and that most of the Eocene basins were neither permanent nor extensive. In the survey of the Snoqualmie quadrangle additional facts were collected concerning the relief of the pre-Eocene surface and the conditions of the Eocene sedimentation. Six Eocene formations were recognized and mapped—three being purely sedimentary and the others volcanic in part at least. The maps and sections of the folio which is in preparation will exhibit two main features; the importance of the present areas of pre-Eocene rocks as structural axes at the beginning of the Eocene, and the variability introduced into the Eocene section by the eruption of two distinct types of lava from different centers at different times. The structural axes in this region have a general northwest-southeast trend, which is paralleled by the trend of the pre-Eocene schistosity as well as the axes of post-Miocene folding and faulting and the later post-peneplain warping in the adjacent Ellensburg quadrangle.

The principal fact presented in this paper was that the present ridges of old schist and granite determined in large measure the boundaries of Eocene basins and retained their structural importance throughout the whole of the very eventful Tertiary period.

The next paper, by J. E. Spurr, was entitled, 'Faulting at Tonopah, Nevada.' In a small area, containing about six square miles, in which the most important mines and prospects are situated, the rocks are a complex of Tertiary volcanic rocks, lavas and tuffs, with a formation of lake-deposited white tuff beds. With the exception of some of the latest lavas, all these rocks have been violently and intricately faulted. The latest rocks are chiefly silicious rhyolite and silicious dacite volcanic necks, the plugs of late Tertiary volcanoes. The faults do not run into them, and the relations indicate that most of the faulting was accomplished before, during and immediately after the intrusion of the necks. The faulting is especially clustered around the dacitic necks, and examination of the fault blocks shows

that they have been noticeably dragged down along the contact of the individual necks, and that the whole later area of dacitic plugs is down-sunken in respect to the adjacent area. Thus while much of the faulting was due to the thrust of the intrusion of the necks, much of it accomplished a collapse and down-sinking around the volcanic centers, subsequent upon eruption.

On account of the extreme irregularity of the volcanic formations, due both to original irregularity and to constantly intervening erosion, it is impossible to project cross-sections underground; but in mines instructive opportunities to study vein faulting in three dimensions are offered. It is there seen that many veins are affected by intersecting systems of close-set faults, producing sometimes an intricacy almost defying analysis.

In the Wandering Boy mine, a vein is affected by two intersecting systems of faults, each system with a nearly uniform amount and direction of throw. The result of these systems is to produce a zigzag line of equal displacement, diagonal between the directions of the two systems, and the blocks are progressively down-thrown along these lines. The strike of the vein is fortuitously parallel with the trend of equal displacement, and the relation of the dip to the vertical displacement such that one offsets the other, so that drifts perpendicular to each other encounter continually fragments of the vein, which thus appears to occupy in this space a horizontal zone.

Mr. Cleveland Abbe, Jr., then presented 'The Historic-Economic Significance of the Fall Line of the Atlantic Slope.' The speaker endeavored in a few words to point out the rôle the Fall Line played in the life of the North American Indians living along its course, showing that it was marked by village sites and may have been used to define tribal boundaries.

The first European explorers probably never pushed as far inland as the falls of the rivers, and the earliest settlements also were made near the mouths of rivers and located on the coastal plain. Only after these settlements were well established did adventurers and pioneers go out from them to the more remote

falls. It was also pointed out that the dates of founding settlements at the falls grow later and later from New Jersey to Alabama, presumably due to the increasing distances of those points from the coastal settlements.

The significance of the falls along the fall line for the industrial development of the bordering regions, and more especially the social and industrial changes which it is bringing about in the southeastern states, was also emphasized. This paper will be published in full in the *Journal of Geography*.

ALFRED H. BROOKS,  
*Secretary.*

#### THE PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 586th meeting was held May 7, 1904, Vice-President Abbe in the chair. •

Mr. I. E. Fowle, Jr., presented some results of work at the Astrophysical Observatory on 'The Absorption of Water Vapor in the Infra-red Solar Spectrum.'

The quantitative investigation of the variation, due to atmospheric water vapor, of the transmissibility of our atmosphere to the incoming solar energy is the primary object of this paper. This transmissibility which decreases from band to band generally with increasing wave-length, although it increases with increasing wave-length in the separate bands themselves, is well expressed by a modification of Bouguer's formula,  $e = e_0 a^{m(23\epsilon_0)}$ ;  $e_0$  and  $e$  are the values of the solar energy of a particular wave-length before and after transmission through our atmosphere,  $a$ , the fractional transmission of a unit layer,  $m$ , the air mass traversed by the beam and  $23\epsilon_0$  is the aqueous vapor in one air mass as given by Hann's general formula,  $\epsilon_0$  being the vapor pressure at the earth's surface. Aqueous vapor seems to have no general absorption between 0.7 and 2.0  $\mu$ . Bouguer's formula implies the absorption by a given quantity of water in vapor as independent of its density.

Mr. S. T. Tamura then presented a condensed mathematical discussion of the problem of 'The Nocturnal Cooling of the Atmosphere.' The paper does not admit of a brief abstract.

CHARLES K. WEAD,  
*Secretary.*

THE AMERICAN CHEMICAL SOCIETY.  
NEW YORK SECTION.

AT the eighth regular meeting of the season, held on May 6, at the Chemists Club, 108 West 55th Street, the following papers were presented:

*A Revision of the Atomic Weight of Beryllium.* C. L. PARSONS.

The paper opened with a summary of the previous determinations of the atomic weight, all of any importance having been made upon the tetra-hydrous sulphate. Following this the results of investigation upon the chloride and sulphate were given, in which it was shown that Arodejew's  $\text{BeCl}_2 \cdot 4\text{H}_2\text{O}$  and Klatzo's  $\text{BeSO}_4 \cdot 7\text{H}_2\text{O}$  do not exist—that the chloride is extremely difficult to obtain perfectly pure, and that the hydrous sulphates lose water so easily under different equilibrium conditions that they are not safe compounds for atomic weight data.

Determinations of the atomic weight were made upon carefully purified beryllium acetylacetonate and basic beryllium acetate. These compounds lend themselves with especial advantage to the determination of the atomic weight of beryllium as they contain no crystal water and are themselves readily crystallized and sublimed. This is especially true of the basic acetate—a compound peculiar to beryllium alone. Spectroscopic examinations of the residues made by Professor Charles A. Hutchins, of Bowdoin College, failed to detect any impurity. The average of seven analyses on the acetylacetonate and of nine on the basic acetate gave the result: Atomic weight—Be = 9.113.

Incidentally a new crystalline compound of beryllium chloride, ether, water and hydrochloric acid was described and it was shown that the black precipitate mentioned by Kress and Moralit, and which they evidently thought must contain a new substance, was a mixture of the sulphides of zinc and iron.

*The Dissociation of Lead Nitrate:* J. LIVINGSTON R. MORGAN.

Using the data of Baekeland (*J. Am. Chem. Soc.*, XXVI., 391–399), the author showed that

at 357° C. the dissociation constant of the reaction  $\text{Pb}(\text{NO}_3)_2 \rightleftharpoons \text{PbO} + \text{O} + 2\text{NO}_2$  is 0.062 when the partial pressures in the application of the law of mass action,

$$\sqrt{p_{\text{O}}} \times p_{\text{NO}_2}^2 = \text{constant},$$

are given in meters of mercury. The presence of an excess of oxygen makes the reaction abnormal in that it favors the formation of oxygen-rich basic salts of lead; while nitrogen peroxide retains the equilibrium in the above form.

By aid of van't Hoff's formula it was also shown that at the average temperature of 262° C. the heat of dissociation is 579, the experimental value being 578 Ostwald calories. At higher temperatures the variation between calculated and observed values is great, pointing to the presence of other compounds possessing different heat values.

*The Action of Sulphuretted Hydrogen on Alkaline Solutions of Zinc Salts:* LEROY W. MCCAY.

Sulphuretted hydrogen precipitates from alkaline solutions of zinc salts zinc hydrosulphide which dissolves completely when the gas is allowed to bubble through the solution for some time. As, if sulphuretted hydrogen be passed into a solution of zinc acetate until all the zinc is precipitated as zinc sulphide, on adding a small amount of caustic alkali and again passing the current of sulphuretted hydrogen through the solution the zinc sulphide dissolves. The reaction is important, as it has a direct bearing on analysis (detection of zinc in the alkaline filtrate from manganese hydroxide). The solution soon becomes turbid from the separation of zinc sulphide. If the liquid be mixed with concentrated solution of the caustic alkalies, or with concentrated solutions of alkali salts, a white, slimy precipitate instantly separates out which contains all the zinc. It would seem that the oxygen and sulphur compounds of zinc are analogous and that corresponding to the alkali zincates there is a class of compounds which may be called the alkali sulphozincates.

*A New Separation of Thorium from Cerium, Lanthanum and Didymium:* ARTHUR C. NEISH.

Many organic precipitants were tried, most of which are weak organic acids. Metanitrobenzoic acid was found to be the best and precipitated thorium quantitatively from a neutral aqueous solution of the nitrate, while cerium, lanthanum and didymium were not precipitated.

Tables were given showing the efficiency of the separation from mixtures of pure salts in the proportions usually found in monazite sands. Five monazite sands from Brazil and two from North Carolina were analyzed by the new method and the results compared with those obtained by the 'combination' and the fumaric acid methods.

The conclusions reached were:

1. Metanitrobenzoic acid precipitates thorium quantitatively as  $\text{Th}(\text{C}_6\text{H}_4\text{NO}_2\text{CO}_2)_4$  from a neutral solution of the nitrate.

2. When the precipitation is repeated it affords a complete separation from cerium, lanthanum and didymium.

3. This method gives as good results in the analysis of monazite as does the 'combination' or fumaric acid method, and has the advantage in that it is shorter and offers no difficulties in precipitation or filtration, while the precipitant is not expensive and avoids the use of alcohol.

*A Crucible Charge for Gold and Silver in Zinc Ores:* E. J. HALL and E. POPPER.

The well-known difficulties accompanying the scorification assay of zinc ores, such as the necessity of taking but a small portion for the assay, the constant attention required, etc., led to a series of experiments conducted with the hope of eliminating both the troubles inherent in any scorification as well as the special difficulties met with in the scorification of zinc blende. After various modifications of the usual crucible charges had been tried, the final charge decided upon was:

Ore .....	$\frac{1}{3}$ A. T.
Soda Ash .....	$1\frac{1}{3}$ A. T.
Litharge .....	25 gms.
Borax Glass .....	20 gms.

This charge was tried on fourteen ores with results agreeing with or exceeding the best figures obtained by scorification. A few typical results follow:

	Zinc. Percent.	Gold and Silver.	
		Scorification. Ounces.	Crucible. Ounces.
A.	8	42.50	42.54
B.	11.5	125.80	129.40
C.	27.5	135.80	139.35
D.	52	40.10	41.34

The charge is not applicable to ores containing more than 7 per cent. of copper. The proper temperature for fusion was found to be from  $750^\circ$ – $775^\circ$  C. and the time required in the furnace 35 minutes.

*A New Crucible Support:* W. E. CHAMBERLAIN.

Three pieces of pipestem are set radially in a metallic ring or in the sides of an asbestos-lined cylinder. The pipestem being movable, the points on which the crucible rests may be adjusted according to the size of the latter, and the position in which it is to be held.

*Note on Milk Analysis:* H. C. SHERMAN and A. W. HAHN.

The average results of many determinations of fat and specific gravity in cow's milk were shown and the following relations noted. Increasing richness in fat from 4.17 to 4.7 per cent. was accompanied by increasing specific gravity, but no corresponding increase of gravity was found as the fat content increased from 4.7 to 5.7 per cent. The percentage of solids not fat (calculated by Richmond's formula) rose with the fat content, though to a much smaller degree. The sum of the fat content and the lactometer reading has been proposed as a basis for the calculation of added water in cow's milk, with the claim that it is a more constant figure in normal milk than the percentage of solids-not-fat. According to the results presented, the solids-not-fat is the more constant figure of the two, and is, therefore, to be preferred as a criterion of watering or a basis for calculating the amount of water added.

H. C. SHERMAN,  
Secretary.

## THE ONONDAGA ACADEMY OF SCIENCES.

THE regular monthly meeting of the Onondaga Academy of Sciences was held March 17 in the rooms of the Historical Association in Syracuse. Mr. Guy Bailey discussed the subject of bird photography. He showed some admirable results of his work in this line. He discussed the nesting and other habits of many of our native birds.

THE April meeting of the academy was held jointly with the Onondaga Historical Association in the latter's rooms on the evening of April 20. Mr. J. S. Pennock, of the Solvay Process Company, addressed the meeting upon 'Alkali Industries.' The lecture was well illustrated with stereopticon views and dealt chiefly with the history of the Solvay process and of the Syracuse plant.

J. E. KIRKWOOD,  
*Corresponding Secretary.*

## THE NEBRASKA ACADEMY OF SCIENCES.

THE fourteenth annual meeting of the Nebraska Academy of Sciences was held at the University of Nebraska, Lincoln, on January 28 and 29, 1904, a goodly number of members being present and a most enjoyable and profitable program being presented.

The papers read were as follows:

*Stratigraphic Delineation of the Benton and Niobrara Formations of Nebraska:* G. E. CONDRA.

In northeastern Nebraska these two formations have been much confused, owing to the similarity in appearance of the chalk rock which occurs in each of the two layers, but a layer of Carlyle clay 200 feet in thickness on the average intervenes between them.

*The Fuel Value of the Common Cottonwood:* C. E. BESSEY.

Weight for weight, cottonwood has a higher fuel value than hickory, oak, or other woods ordinarily used for fuel, though, bulk for bulk, it is inferior. It also grows relatively more rapidly, so that for Nebraska it is a more valuable tree to plant for fuel than any other of the varieties used for that purpose.

*A Method of Preserving Insects:* A. A. TYLER.

*How nearly can Latitude and Time be found by Means of Shadows:* G. D. SWEZEY.

*Tests on Artificial Building Stone:* E. G. WOODRUFF.

*Hybridization of Oaks:* H. B. DUNCANSON.

*The Origin and Occurrence of Arikaree Quartzite:* G. E. CONDRA.

*The Fish Tape-worm, a Human Parasite new to Nebraska:* HENRY B. WARD.

Noticing the occurrence of the common fish tape-worm of Europe in persons emigrant from Russia.

*The Pronunciation of Scientific Names:* F. E. CLEMENTS.

*The Strength of Nebraska Timber:* G. R. CHATBURN.

Reviewing some recent tests made upon various Nebraska grown timbers in the course of an extensive investigation of the subject.

*New Species of Cladocera from Lake Erie:* CHARLES FORDYCE.

*A Summer's Botanizing at Bellevue, Nebraska:* A. A. TYLER.

*Building Stones of the Carboniferous of Southeastern Nebraska:* E. G. WOODRUFF.

The most important quarry was stated to be at Cedar Creek, from which forty to fifty carloads a day are shipped.

*The Status of the Botanical Survey:* F. E. CLEMENTS.

*Implement-making Materials of Nebraska Aborigines:* E. E. BLACKMAN.

*Cement Possibilities of Northern Nebraska:* G. E. CONDRA.

*Word-spectra and their Value as Tests of Authorship:* R. E. MORITZ.

*Variations in the Larval Amblystoma:* J. H. POWERS.

The causes of variation were traced on analyzing various types of variation, first, to a variable food supply, and second, to variation in habits.

*The Terraced Appearance of Tree Growth on the Missouri Flood-plain:* G. E. CONDRA.

*The Foresting of the Sand-hills of Nebraska:* C. E. BESSEY.

*Occurrence of Solifugae in Nebraska:* M. H. SWENK.

*Some Points on Dermatobia hominis* (illustrated): H. B. WARD.

The presidential address was delivered by Lawrence Bruner upon the subject, 'Migrations of Birds.'

The following officers were elected for the ensuing year:

*President*—Professor H. B. Duncanson, State Normal School, Peru.

*Vice-President*—Professor O. V. P. Stout, University of Nebraska, Lincoln.

*Secretary*—Dr. R. H. Wolcott, University of Nebraska, Lincoln.

*Treasurer*—Mr. A. E. Sheldon, Lincoln.

*Directors*—Professor J. H. Powers, Doane College, Crete; Professor G. R. Chatburn, University of Nebraska, Lincoln; Professor R. A. Emerson, University of Nebraska, Lincoln; Mr. I. S. Trostler, Omaha.

R. H. WOLCOTT,  
Secretary.

#### DISCUSSION AND CORRESPONDENCE.

##### NAMATOGÆAN OR EPIGÆAN?

TO THE EDITOR OF SCIENCE: I suppose every one who has had occasion to write of ecology has mentally grumbled because we have not in English a convenient short word to express what we mean when we say 'land and fresh water,' of mollusks or other invertebrates.

The German 'Binnen,' when translated into its English equivalent 'inland,' does not seem quite adequate, since the sense is rather 'away from the sea,' instead of 'not of the sea,' or 'of the land and its waters,' whether near or far from the coast.

'Land shells' seems to exclude the inhabitants of streams and pools.

Annoyed by the clumsy periphrasis which it has seemed necessary to use, I have spent some time in search for an expression, not already dedicated to some other purpose, which could be used in such cases.

*Epigæan* was at first thought of as suitable; its meaning, 'upon the earth' (earth being understood in the wide sense of land or continent), is not inappropriate, the sound is harmonious, and the word brief.

The only criticism which suggests itself is that there is nothing in the word directly implying the inclusion of the fresh-water forms.

*Gæa* was used by the Greeks for the land, in antithesis to *Thalassa*, the sea, but *Gæan* seems subject to the same criticism as *Epigæan*, while *Hydrogæan* would seem to imply inhabitants of the land-waters only and not both land and fresh water.

Many of the compounds of 'gæa' are inharmonious or too long to seem acceptable.

The Greek '*Nama*,' meaning spring, rivulet or stream (whence '*Namatodes*,' abounding in streams), seemed to offer a possible compound not too harsh or otherwise unsuitable. Would '*Namatogæan*' seem too cumbersome? I should be very glad to have suggestions from the readers of SCIENCE, some of whom may have in their inner consciousness at this moment the very term needed.

WM. H. DALL.

SMITHSONIAN INSTITUTION,  
June 2, 1904.

##### THE BLACKENING OF TEETH IN THE ORIENT.

TO THE EDITOR OF SCIENCE: I do not find among my notes a good reference to the blackening of the teeth in the orient, as to the materials, utensils, motives and distribution. If you will give expression to my poverty, surely some one will help me out.

O. T. MASON.

##### 'VEGETABLE BALLS.'

WITH regard to Professor Ganong's query on the above subject in SCIENCE, of April 8, 1904, the following reference is given in De Ioni's '*Sylloge Algarum*,' Vol. IV., Section I. (1897). The reference occurs on p. iv of the Bibliography and reads: 'Barclay G—Algoid Lake-balls from South Mist—s. n. t., 8°, 1 plate.'

The reference is obviously very incomplete but it may possibly refer to 'The Scottish Naturalist' or its present continuation the 'Annals of Scottish Natural History.' South Mist is one of the Islands forming the Outer Hebrides.

J. ADAMS.

ROYAL COLLEGE OF SCIENCE, DUBLIN.